

# JTFp Final Report Outline

**Presented to:**

**AMG-14**

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# BRIEFING OUTLINE

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- I. Final Report Overview**
- II. Final Report Outline**
- III. Features**
- IV. Compilation Process**
- V. Availability / Schedule**

# JTFp FINAL REPORT OVERVIEW

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## PURPOSE


- The JTFp Final Report is intended to capture and make available for access by the community the protofederation experience.

## SCOPE

- The JTFp Final Report covers design, development, integration and test, and use of the protofederation in evaluating the HLA Baseline.
- It includes the activity of the entire integrated JTFp Team.

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# **JTFp FINAL REPORT OUTLINE**

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- I. INTRODUCTION**
- II. PROGRAM OVERVIEW**
- III . ISSUES IDENTIFICATION and EXPERIMENT DESIGN**
- IV. JTFp SYSTEM DESIGN**
- V. PROTOTYPE DEVELOPMENT ACTIVITY**
- VI. EXPERIMENT EXECUTION - HLA TEST and EVALUATION**
- VII. HLA TECHNOLOGY EVOLUTION**
- VIII. NET ASSESSMENT and LESSONS LEARNED**

# BRIEFING OUTLINE

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**I. Final Report Overview**

**II. Final Report Outline**



**III. Features**

Program Schedule

System Engineering Database

Issues Identification

Scenario

FOM

Test Plan

System Architecture Specification

Integration Strategy

Test Execution

Technical Coordination

Net Assessment and AMG Decision Support

**IV. Compilation Process**

**V. Availability / Schedule**

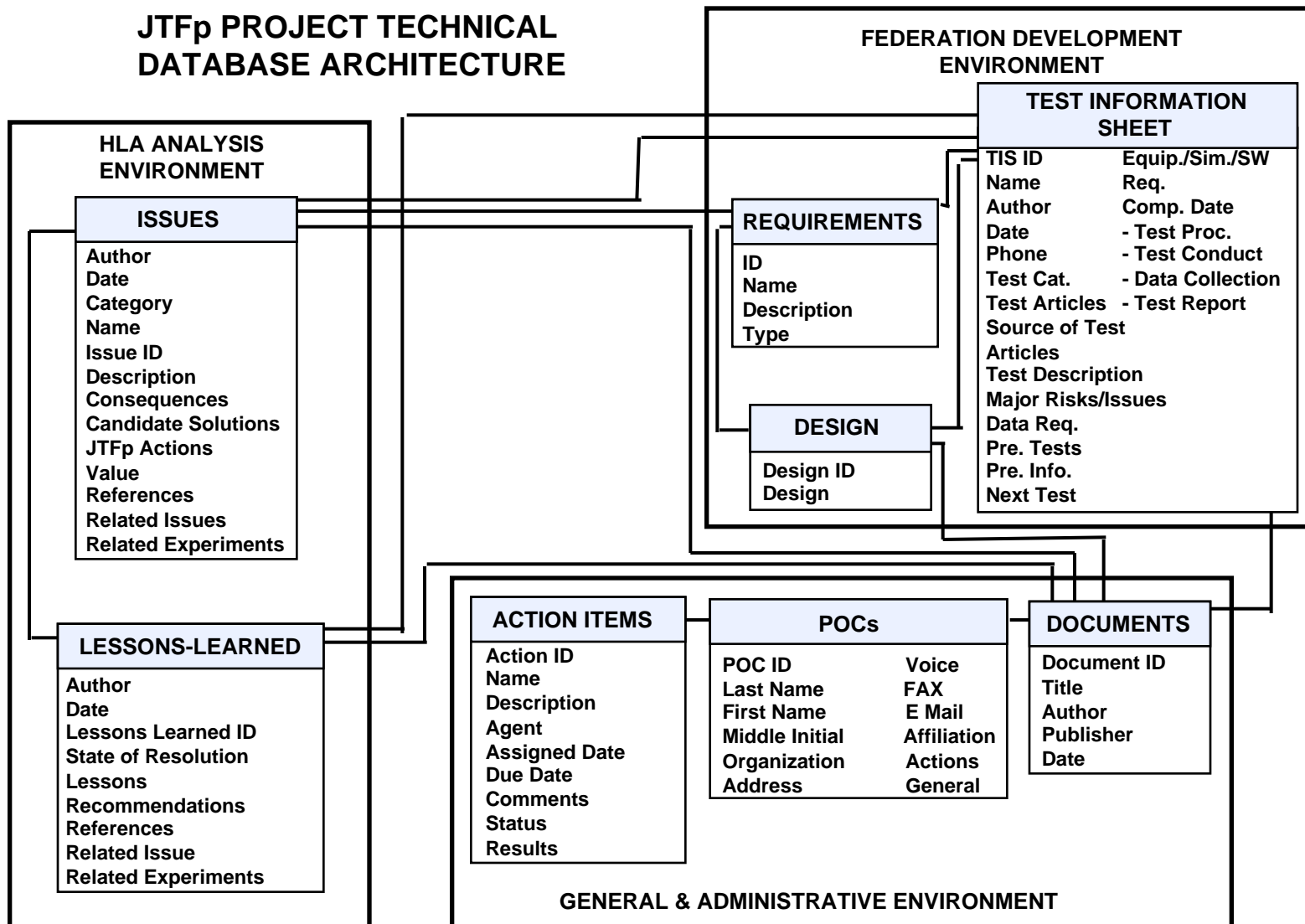
# FEATURES

- Program Schedule -



# FEATURES

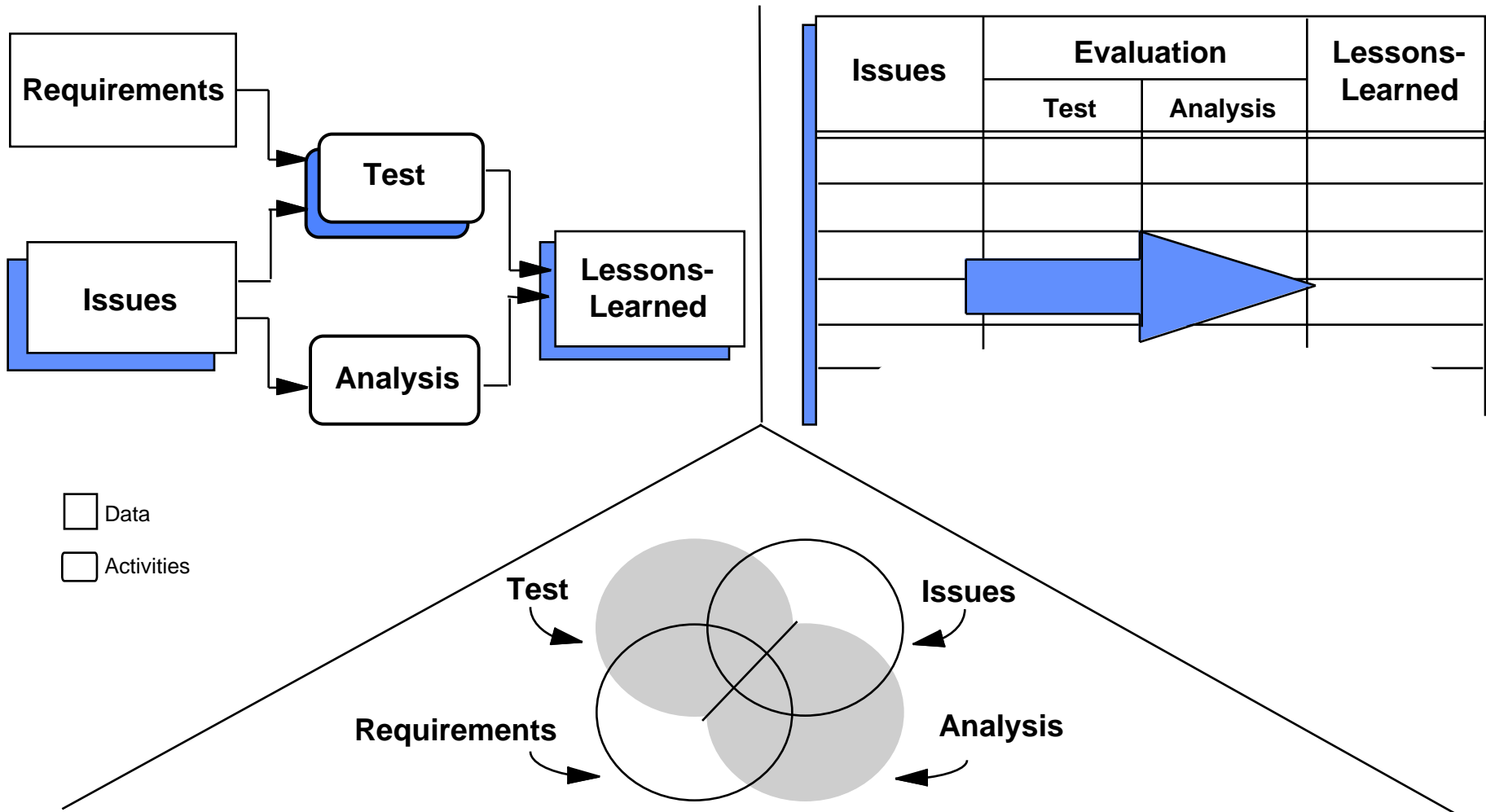
## - System Engineering Database -





# FEATURES

## - Issues Identification -



# **FEATURES**

## **- Scenario -**

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- **SITUATION DESCRIPTION**
- **ORDER OF BATTLE (SCENARIO ELEMENTS)**
- **MISSIONS (FUNCTIONS)**
- **SCENARIO ELEMENT INTERACTIONS**
- **INITIAL CONDITIONS**
- **SCENARIO EVENT TRACE**

# FEATURES

## - FOM -

**JTFp Federation CLASS STRUCTURE TABLE**

Base Class	1st Subclass	2nd Subclass	3rd Subclass
Player	AirPlayer	BallisticMissile	
		Aircraft	
		Flight	
	GroundPlayer	FixedSite	
		MobileGroundPlayer	
		AggregateGroundPlayer	
	AfloatPlayer		
DiscreteEntity	BallisticMissile		
	Aircraft		
	FixedSite		
	MobileGroundPlayer		
	AfloatPlayer		
AggregateEntity	Flight		
	AggregateGroundPlayer		
DeadReckonedMover	AirPlayer		
	MobileGroundPlayer		
	AggregateGroundPlayer		
	AfloatPlayer		
NonMover	FixedSite		
Environment	Atmosphere		
	SurfaceCover		
	OpenWater		
FederateStatus			

# **FEATURES**

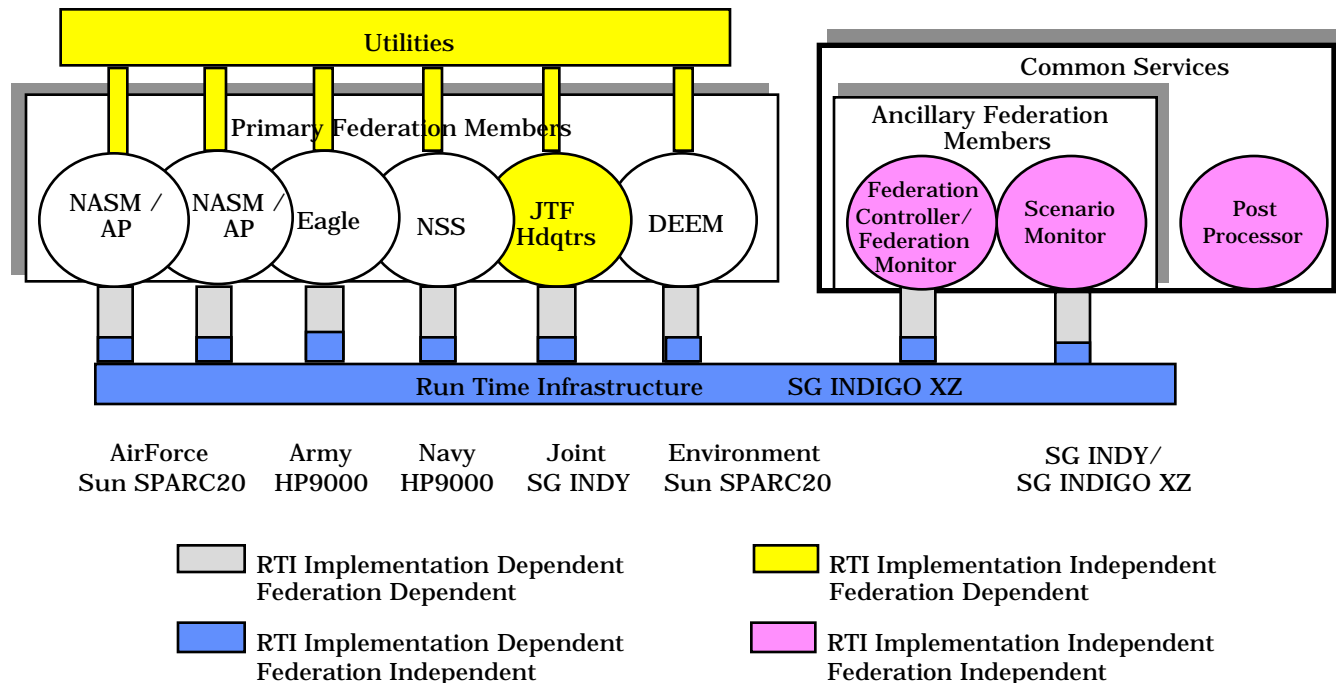
## **- Test Plan -**

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- **RTI PLATFORM INTEGRATION TESTING**
- **FEDERATE PLATFORM INTEGRATION TESTING**
- **HLA COMPLIANCE TESTING**
- **JTFp INTEGRATION TESTING**
- **JTFp ISSUE RESOLUTION**
- **JTFp FUNCTIONAL PERFORMANCE TESTING**

# FEATURES

## - System Architecture Specification -



# JTF HQ MIDDLE-LEVEL SYSTEM SPECIFICATIONS

Functional Layer	MMI	JTF Model	HLA Interface
System Object Layer	TBD		
Software Object Layer	JTFHQ Application Object	JointHQ Object	InterSimulationServices Object
Component Layer	JTFHQ Component		
Process Layer	JTFHQ Process		
Software Platform Layer	Motif	GUI Class Library	OpenGL
	X-WINDOWS	RTI Library	IDL C++
	UNIX Operating System		TCP/IP
Processor Layer	R4600SC		
Physical Layer	Silicon Graphics Indy		
	IEEE 802.3 RJ45, 10BaseT Ethernet		

Elements of the Interface View are within gray areas

[illegible]

# **FEATURES**

## **- Test Execution -**

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# **FEATURES**

## **- Technical Coordination -**

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- **AMG**
- **PROTO-FED LEAD**
- **OMTWG**
- **I/FWG**
- **TIME MANAGEMENT WG**
- **TEST WG**
- **DECLARATION MANAGEMENT WG**
- **ENVIRONMENTAL WG**
- **RTI MANAGEMENT WG**
- **AGGREGATION / DISAGGREGATION TIM**

# FEATURES

## - Net Assessm't & AMG Decision Supp't -

JSIMS Minimum Set of Tests/Evidence								
JSIMS CONCERNS	JSIMS Issue #:	JTFp Issue No.:	Analysis	Other activities	Level of investigation	Status Complete	Summary of findings	Lessons Learned Number
HIGH PRIORITY:								
1. Performance:								
a. Bandwidth	3	95		HLA Performance Modeling, Proto-Federations	None	N/A		
b. Latency	1	36		HLA Performance Modeling, Proto-Federations	None	N/A		
c. Fidelity	16	7, 41	x		Analysis	In Process	TBD	
2. Distributed	5	JTFp System Integration	x		2 Tests, 2 Analyses	Complete	JTFp System Integration testing has been completed successfully. We have shown that the RTI can support a distributed simulation, including some limited man-in-the-loop capability.	
3. Interoperability	18	40, 84	x		Test, 2 Analyses	Complete	The FOM promotes intra-federation interoperability, but does not sufficiently promote inter-federation interoperability. A FOM Development Tool would be of great benefit, by providing more of a standard. Key to enhancing interoperability, are the service specifications provided by the interface specification. These specifications should sufficiently provide mechanisms for declaration management, object management, data distribution management, ownership management, time management, federation management, object concurrency control (mediation strategies) management, object transaction, object security, and object querying or they do not reach the measure of interoperability of other commercially developed specifications. The current Interface Specification (version 1.0) does not reach this measure.	36, 37
4. Time Management Spectrum	2	69, 39, 54	x	time management group (Fujimoto), Metron (Stevens/Steinman), UK group, PADS (Parallel and Distributed Simulation)	Test, 2 Analyses	Complete	For a federation in which all federates are conservatively synchronized, the RTI support is adequate. For conservatively synchronized simulations with RELIABLE message delivery and TIMESTAMP ordering, that synchronization is achieved in both as-fast-as-possible and (scaled) real-time executions. The RTI supports different time management strategies well. The HLA provides timing and delivery services adequate for JTFp requirements.	43, 47
5. Causality and Repeatability	14	97		Analysis Protofed, Eagle-Eagle Experiment	Test	Complete	Strict federation causality is achieved through the use of RELIABLE delivery and TIMESTAMP ordering of all message traffic. By using deterministic federates, reliable message delivery, and timestamp ordering, repeatability is achieved.	44
6. Scalability	13	14	x	IEC (DM experiments), Analysis Proto-Federation, Eagle-Eagle Experiment	Test(?), Analysis	Analysis Complete	There are at least three issues: 1) a federation w/ many federates, 2) a federation w/ many objects, 3) a federation w/ large objects (many attributes or much data). The importance of time management increases as a system gets "large" for any reason.	38
MEDIUM PRIORITY:								
7. C4I Interface	8	14, 56		MRCI effort, JPSD Experiment, and Engineering Protofed	None	N/A		38
8. Aggregation/Disaggregation	15	68		JPSD Experiment	None	N/A		
9. Composability	17	None		WARSIM Study? (new)	None	N/A		
10. Utilities and Services Support	7	106	x		Analysis	Complete	Dynamic services rely on state information for resolution, therefore, these services must maintain synchronized communication with the participating federates. The JTFp determined the most effective method of providing a common, consistent, dynamic environmental model was through full federate representation. This provided for both environmental phenomena and line-of-sight calculations. Therefore the access method implemented was an interface with the RTI. In the JTFp all static services were implemented within the federates. There are inherent problems with the JTFp chosen methods of implementation. First, there is the development overhead involved in implementing functionally identical code in all the federates. Second, there is the loss of reusability of this code.	
11. Environmental Representations	6	55	x		Analysis	Complete	No aspects of the HLA preclude a common environmental representation. No one environ. rep. is appropriate for all potential HLA applications. Additional HLA / RTI features would make establishing a common environ. rep. easier / more efficient, e.g. a set of advanced spatial and temporal filtering tools	21
LOW PRIORITY:								
12. Expandable/Extensible RTI Services	9	35	x		Analysis	Complete	More efficient methods of service implementation could be achieved if there was a means of extending RTI services to those that were specific to the particular federation. This could be a simple interface to the RTI or a method of linking these services to the RTI. The services then could be accessed by the federates without requiring the services to be packaged as a full federate member. Such services could include those dynamic services that are required by all federates (and most instances all federations) such as those that affect fair-fight.	22
13. Lifecycle Plan for HLA	11	None		AMG Transition Plan	None	N/A		
14. HLA Constraints	10	None		(Roll-up of all else)	None	N/A		
OTHER:								
15. Security	4	None		Security Architecture Group	None	N/A		
16. RTI Software Lifecycle Plan	12	None		DMSO	None	N/A		

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# COMPILATION PROCESS

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- DRAFT OUTLINE
- PROVIDE EXPOSITORY GUIDANCE  
TEMPLATE [HIDDEN TEXT]
- SOLICIT INPUT FROM TEAM
- EDIT AND CIRCULATE TO TEAM FOR REVIEW
- PUBLICATION
- DELIVERY TO DMSO

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# AVAILABILITY / SCHEDULE

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